UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

ORACLE, INC. Plaintiff, v. GOOGLE INC., Defendant.	)	Case No. CV 10-03561 WHA

HIGHLY CONFIDENTIAL

REBUTTAL EXPERT REPORT OF DR. GREGORY K. LEONARD

Contents

I. Qualifications

1. My qualifications are as described in my February 8, 2016 Expert Report ("Leonard Report").

II. Assignment and Materials Considered

2. I have been asked by Google to review and respond to the expert reports of Adam Jaffe, ("Jaffe Report"), Chris Kemerer ("Kemerer Report"), and Douglas C. Schmidt ("Schmidt Report"), all dated February 8, 2016.

3. In addition to the materials I considered in preparing the Leonard Report, I reviewed the Jaffe, Kemerer, and Schmidt Reports, materials cited in those reports, and materials cited in this report.

4. Regarding my anticipated trial testimony in this action, I may use as exhibits various documents or other materials relevant to the issues addressed in this report. I also reserve the right to use demonstrative exhibits, enlargements of actual exhibits, animations and any other kind of information in order to convey my opinions. I reserve the right to supplement my report, for example, if additional information becomes available.

III. Summary of Opinions

5. As explained in further detail below, I disagree with Dr. Jaffe's conclusion that "Google's copying of the Java API packages demonstrate none of the economic indicia of fair use,"[1] and with Dr. Jaffe's analysis, from an economic perspective, of the first and fourth factors of the fair use test.[2] Dr. Jaffe's analysis contains several fundamental errors, described below. I likewise disagree with the fair use analysis in Dr. Schmidt's report, which relies on and incorporates the Jaffe Report and its analysis, particularly with respect to the issue of the relevant markets at issue in this case.

[1] Jaffe Report ¶ 9.

[2] Jaffe Report ¶¶ 9-26.

6. As I understand the first fair use factor, it is a relevant consideration whether and to what extent the allegedly infringing work is "transformative" of the copyrighted work at issue. In other words, it is relevant whether the allegedly infringing work used the copyrighted work at issue to create a new and different kind of work that "'adds something new, with a further purpose or different character, altering the first with new expression, meaning, or message.'"[3] As a matter of economics, Google's Android operating system is transformative of the allegedly infringed work—the declaring code and structure, sequence, and organization ("SSO") of 37 API packages used in the Java SE platform—for two primary reasons. First, Android is an entirely different kind of software product—a full-stack mobile operating system—from Oracle's Java SE platform, which was an applications framework that could not operate any device by itself. Second, Android is designed for use and is used in a new and different generation of hardware product—smartphones—whereas Java SE was designed for desktop computers and servers and has never been used in a commercially successful smartphone product.[4] (Neither, for that matter, has Java ME, a different Sun/Oracle applications framework designed for an earlier generation of mobile devices known as feature phones.) Finally, Dr. Jaffe contends that Android is a

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[3] *Campbell v. Acuff-Rose Music, Inc.*, 510 U.S. 569, 579 (1994).

[4] The industry market research firm IDC, which provides separate sales data for the smartphone and feature phone categories, defines a smartphone as follows: "These devices contain a high-level operating system including but not limited to Android, BlackBerry OS, Firefox OS, iOS, Sailfish, Tizen, Windows Phone, Symbian (S60 or higher), or other HTML-based platforms. Third-party applications must be able to be natively installed, and they must be able to run while not connected to the Internet to qualify as a high-level OS." In contrast, IDC defines a feature phone as follows: "To be classified as a feature phone in IDC's taxonomy, the device must run a proprietary or real-time operating system (RTOS). An RTOS that powers a feature phone is typically tightly controlled by the manufacturer of the mobile phone. Software developer kits, for example, unlike smartphone/high-level operating systems, aren't widely available for all developers. If the feature phone runs third-party software, it does so with the help of interfaces such as BREW or Java ME. Feature phones also typically have less processing and memory power than smartphones. IDC's feature phone category also includes basic, or 'send and end' phones, which are designed to perform phone calls, SMS, and nothing more." See "IDC's Worldwide Mobile Phone Tracker Taxonomy," IDC, 2014. A 2010 Oracle document suggests a delineation based on processor speed. OAGOOGLE0002631102-5 at 3. Mr. Barr testified that smartphones are characterized by more features, larger screens, and a larger variety of available applications and Java ME lacked an advanced user interface. Barr Dep., pp. 165-166, 246-247 and 259.

commercial product, but I understand that even a commercial product may be considered transformative and thus eligible for the fair use defense.[5]

7. As I understand the fourth fair use factor, the relevant inquiry is the extent to which the allegedly infringing work caused harm to the market for the copyrighted work at issue, which in this case is the Java SE applications framework. As a matter of economics, Android has not caused any harm to Java SE, because Android is an entirely different product from, and thus not a substitute for, Java SE. As discussed above, Android is a full-stack operating system, whereas Java SE is only an applications framework, and Android is used in smartphones, whereas Java SE was designed for use in desktop computers and servers and has never been successfully used in a mobile device.

IV. There is No Single "Java Platform," and the Copyrighted Work Asserted in This Case is Part of the Java SE Platform, not the Java ME Platform

8. Throughout his report, Dr. Jaffe refers broadly to "Java" and to "the Java platform," rather than focusing more precisely and specifically on the relevant aspects of the Java technology that are at issue here. As a result of his imprecise usage, many of Dr. Jaffe's factual assertions and conclusions are wrong or misleading. As discussed in the Leonard Report, "Java" is a term that can refer to many different things—including a programming language that is free and open for anyone to use—and is thus not a helpful shorthand for the specific technology at issue in this case, which is limited to the declaring code and SSO of 37 API packages used in two editions of the Java SE platform. Likewise, there is no single "Java platform." Instead, there are several distinct Java platforms, each designed for use with particular categories of devices. For example, the copyrighted material asserted in this case is part of Java SE, an applications platform designed for use and used in desktop computers and servers. However, much of Dr. Jaffe's report focuses on a different "Java platform," Java Micro Edition ("Java ME"), which was designed for use and has been used in smaller, less sophisticated devices such as

[5] See, e.g., *Perfect 10 v. Amazon Inc.,* 508 F.3d 1146 (9th Cir. 2007).

feature phones. Sun Microsystems and Oracle Corporation have also developed the Java Enterprise Edition ("Java EE") platform, designed for use and used in large, multi-tier client-server enterprise applications, and the Java Card platform, designed for use and used in smart cards and other devices with very small memory capacities.

9. Distinguishing among these platforms, and understanding the differences between them, is important for analyzing the economic issues in this case. Of particular importance is the fact that Java ME—the only Java platform that Sun offered for mobile devices (although never for smartphones) prior to the launch of Android by Google in late 2007—is not the copyrighted work at issue in this case and, as Oracle's own expert Chris Kemerer confirms in his January 8, 2016 report, does not even contain the accused declaring code and SSO of the 37 Java SE API packages.[6] In contrast, Java SE, which is the copyrighted work asserted in this case and does contain the declaring code and SSO at issue, had not been used in a commercially successful fashion in a mobile device at the time of the Android launch.[7]

V. Java ME Is Not a Substitute For Android

10. At a fundamental level, Java ME is not a substitute for Android, as Dr. Jaffe contends, because Java ME is not a full-stack operating system like Android; it is only a platform for running

[6] Kemerer Opening Report (Jan. 8, 2016) at Appendix S.

[7] Oracle may claim that SavaJe used Java SE in a smartphone. However, as discussed in the following section, Java SE is not a substitute for Android because it does not offer the functionalities that Android offers (e.g., it is not an operating system). Further, as I discussed in the Leonard Report, SavaJe, both on its own and after being acquired by Sun, was a commercial failure that made no impression in the then-nascent smartphone market at a time before the Android launch. Leonard Report ¶¶ 257-263. The contemporaneous reviews of the SavaJe Jasper, a mobile phone incorporating JavaSE, were scathing, e.g., "Jasper S20 Cellphone Rocks The Java OS, People Flee in Fear," October 27, 2006, http://gizmodo.com/210575/jasper-s20-cellphone-rocks-the-java-os-people-flee-in-fear ("Lots of people hate Java for being both slow and a memory hog, so what better place to put it than on a mobile phone?"); "SavaJe releases Jasper S20 Java Phone," May 13, 2016, http://www.engadget.com/2006/05/13/savaje-releases-jasper-s20-java-phone/ ("if you're a Java developer or you just like dated tech running a relatively untested software platform, the Jasper S20 might be the phone for you"), and the device was a commercial failure. Thus, Dr. Jaffe's claim that Sun's and Oracle's Java SE platform is a substitute for Android, or was suited for use in mobile devices without being transformed as Google did, is incorrect.

applications on a device. As such, Java ME cannot be used on a device at all unless the device has a separate operating system.[8] Android, in contrast, is a complete operating system that provides all the software functionality required to operate a world-class modern smartphone with all the features that modern smartphone users expect—e.g., a high-resolution color touchscreen, a fast processor and substantial memory (to support high performance applications), wireless telephone and SMS connectivity, an HTML Web browser, a camera, a security framework—in addition to an applications framework that provides a wide range of APIs.[9] It makes no economic sense to argue that Java ME is a substitute for a piece of Android when Android is not used in a piecemeal manner—it is used as an integrated product, which provides substantially more functionality than Java ME. Not only does Java ME not provide an operating system or the large majority of the functionalities that Android provides, I understand that it does not even contain the 37 API packages whose declaring code and SSO are the copyrighted materials at issue in this case. This is because Java ME is, and has always been, a simpler and less functional product than Android, designed for use in different devices. In fact, I understand that the Java ME platform contains only 10 API packages in total, as compared to the 168 API packages in Android.[10]

11. Dr. Jaffe also suggests that Android was a "non-marginal" substitute for Java ME at the applications platform level alone, because it superseded Java ME.[11] This is wrong as a matter of fact and

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[8] Astrachan Report ¶¶ 133-143; Ringhofer Dep. at 248:17-249:13,

[9] Leonard Report ¶¶ 67-78.

[10] Astrachan Report ¶¶ 105, 137.

[11] Jaffe Report ¶ 291. Dr. Jaffe claims that "end-customers, such as mobile OEMs and app developers, will choose one or the other [i.e., Android or "Java" (where Dr. Jaffe does not specify which "Java" he is referring to)], but not both." Id. This claim is inconsistent with the actual behavior of both OEMs and app developers. For example, HTC and Samsung have offered smartphones with the Microsoft Phone operating system, as well as Android smartphones, see, e.g., "Windows Phone 8X by HTC Specs and Reviews," http://www.htc.com/us/smartphones/htc-wp-8x/, "ATIV Odyssey Windows Phone from Verizon -4G LTE Smartphone," http://www.samsung.com/us/mobile/cell-phones/SCH-I930MSAVZW. Similarly, as discussed in Leonard Report, many mobile app developers not only know multiple programming languages, but develop in multiple languages for various commercially viable platforms. In particular, many developers write apps for

economics. As also discussed in the Leonard Report, Java ME is not suitable as an applications programming platform for smartphones and has not been used as an applications platform in smartphone products.[12] Instead, Java ME has been used almost exclusively on the previous generation of mobile phone products, known as "feature phones," which have substantially fewer capabilities than smartphones and are in the process of being phased out of the market in favor of more sophisticated smartphone products.[13] As discussed above, Java ME, with only 10 API packages in total, does not contain the vast majority of the functionality required by modern smartphone users. Android, in contrast, was designed specifically for smartphones, has the functionality required for those products, and has been used predominantly in that context, rather than for feature phones.[14]

12. Dr. Jaffe's argument therefore reduces to the claim that feature phones using the Java ME applications framework are substitutes for smartphones using the full-stack Android operating system. However, this argument is also incorrect. Feature phones are not in the same market as smartphones as the term "market" is used by economists in, for example, antitrust analysis.[15] The

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both Android and iPhone, and many of the most popular Android apps were initially written for and offered on iOS devices. Leonard Report ¶ 106.

[12] Leonard Report ¶¶ 240-244. An exception is Blackberry products, which were aimed at business users, not consumers. Dr. Jaffe also points to the HTC Touch Pro as a smartphone that had Java ME on it. Jaffe Report ¶ 112-113. However, the operating system for this product was Microsoft Windows, which used C# as the applications programming language. "HTC Touch Pro Specifications," CNET, http://www.cnet.com/products/htc-touch-pro/specs/. Thus, Java ME was at best a second tier functionality on this product, not a replacement for any operating system, and not a substitute for Android. Dr. Jaffe does not explain how, if at all, Java ME enhanced the functionality of the HTC Touch Pro—for example, by showing that any meaningful number of users ran a meaningful number of Java ME applications on that device.

[13] Leonard Report ¶¶ 240-244.

[14] Dr. Jaffe claims that the Android One initiative will promote the development of lower end Android smartphones in developing markets that will be more similar to feature phones. Jaffe Report ¶¶ 344-348. However, even on the lower end, any Android One phone using the Android operating system still would be a smartphone and still would require and use functionality which none of the various Java platforms, including Java SE or Java ME, could provide. Moreover, that initiative is just underway and its market impact, if any, will only be seen in the future. Notably, given that Google has now switched over to the licensed OpenJDK versions of the 37 APIs at issue in this case, any market impact of Android One will be non-infringing.

[15] See, e.g., Jonathan Baker, "Market Definition: An Analytical Overview," Antitrust Law Journal (2007).

market in which a product such as an Android-powered smartphone competes is limited to other products that provide consumers with reasonably equivalent features and functionalities. For example, in the case of an Android smartphone manufactured by Samsung, its closest competitors are other smartphones, including Android smartphones manufactured by other OEMs (such as HTC or LG), Apple's iPhone, and Microsoft's Windows Phones. A feature phone, which does not contain the functionality consumers expect and demand from smartphones, would not be considered an adequate substitute for a smartphone by a consumer interested in purchasing a smartphone. Similarly, in the case of an Android tablet manufactured by HTC, its closest competitors are other tablets, including other Android tablets, Amazon tablets, Microsoft tablets, and the Apple iPad, not feature phones. The primary competitive constraint on Android devices as a group is provided by other smartphones such as the iPhone, which runs the separate and distinct iOS operating system, not by older operating systems primarily designed for feature phones, such as Symbian, much less an applications framework like Java ME, which is not even an operating system.

13. Rather than claiming that Java ME has been displaced by Android, as Dr. Jaffe does, a more accurate characterization of what has occurred is that an obsolete product category—feature phones (which may or may not have Java ME on them)—has been displaced by a new and substantially different product category—smartphones (with or without Android). The phenomenon of an old product being displaced by a new and substantially different product is commonplace: cars displaced horse-drawn buggies, email displaced physical mail deliveries, word processing software displaced typewriters, and so on. Often in these situations, the new product has substantially different product characteristics than the old product. As discussed above, markets are defined to include only those products that are viewed as close substitutes by users. Because consumers substitute between products based on their preferences over product characteristics, products with similar characteristics tend to be closer substitutes (and thus closer competitors) for each other than they are with products

that have different characteristics. Accordingly, in a situation where a new product with substantially different characteristics has displaced an old product, the individual brands that constitute the new product (e.g., Microsoft Word and WordPerfect in the case of word processing software) typically are in a separate market from brands of the old product (e.g., Corona typewriters) because the brands of the new product are much closer competitors for each other than they are for the brands of the old product. Put another way, if Microsoft Word increased its price, most of the sales it would lose would be to competing word processing software such as WordPerfect, not typewriters. Smartphones provide a substantially different set of functionalities than feature phones. For this reason, as with word processing software and typewriters, smartphones are in a separate market from feature phones.

14. Many Oracle documents contain acknowledgements from the Oracle employees responsible for the Java business unit, and Java licensing in particular, that smartphones and feature phones are distinct markets.[16]

15. Indeed, the extent of the product differentiation between smartphones and feature phones and the fact that feature phones are going the way of the horse-drawn buggy demonstrate that smartphones have added substantial value to the economy and that Android, as one of the drivers of smartphone innovation, has been transformative, as I understand that term. Android has addressed a need that was not being met by existing devices and, as a consequence, substantially expanded sales of smartphones and provided the benefits of that technology to the public. I understand that the general benefit provided to the public by an allegedly infringing work is also relevant to the fair use inquiry.

16. However, it is important to recognize that the displacement of feature phones by smartphones is not limited to Android smartphones. The displacement started (at least) with the iPhone and would have increased over time whether or not Android existed because feature phones did not

[16] See, e.g., DX1400; DX1422; OAGOOGLE00024737983-014; Stahl Dep., pp. 204-207.

offer the product characteristics that end users wanted.[17] Moreover, the alleged infringement is not responsible for any displacement in any event. The same displacement would have occurred had Google, for example, used the OpenJDK versions of the declaring code and SSO of the 37 API packages at issue or used (only) C/C++ as the applications programming language.[18] As noted, iPhone sales have also substantially displaced sales of feature phones, and iOS has predominantly used the previously little-used Objective C language, and has never used the Java language or any aspect of the 37 API packages at issue here.

17. A further reason why Java ME was not a substitute for Android was that Java ME was a stagnant product that had been neglected by Sun (and later Oracle), had limited functionality, and was highly fragmented.[19] Indeed, Java ME no longer met the demands even of *feature phone* OEMs (let alone smartphone OEMs). I addressed this in the Leonard Report, where I showed that Java ME licensing revenue per feature phone declined sharply over time, a market outcome that cannot be blamed on Android (since Android was not used on feature phones).[20] Instead, this market outcome indicates that Java ME was no longer suitable even for feature phones. A further implication of this is that much of the displacement of feature phones by smartphones involved feature phones that did not even have Java ME on them.

VI. Java SE is Not a Substitute For Android

18. Dr. Jaffe's report also discusses Java SE, in addition to Java ME, although he does not claim to describe any harm to Sun or Oracle related to lost licenses of Java SE. But his analysis is equally flawed with respect to Java SE. Like Java ME, Java SE is just an applications framework and not a full-

[17] Leonard Report ¶¶ 50-51.

[18] Leonard Report ¶¶ 100-103, 106-111, 148-150, 174-178, and 270.

[19] Leonard Report ¶¶ 208-209, 211-228, 237-242,

[20] Leonard Report Exhibit 4b.

stack operating system. In order to operate on any device, Java SE must be paired with an operating system and other software; it does not work, and cannot provide any value to the end user, without these additional products. Android, by contrast, is capable of powering devices entirely on its own, because it contains full-stack functionality. Further, as discussed above, Java SE has never been used in a commercially successful smartphone product. This is because Java SE was not designed for mobile devices of any kind, including smartphones; I understand that many of the Java SE API packages are not useful in a smartphone context and their inclusion in a smartphone would tend only to disable the functionality required to make such a device useful to consumers.[21]

19. To the extent Dr. Jaffe contends that Android was a "non-marginal" substitute for Java SE, or that Android superseded Java SE, this is also wrong. Java SE was designed for use in desktop computers and servers, not smartphones. Even with respect to the non-mobile devices for which it was designed, Java SE was widely viewed as slow and as using too much memory; when SavaJe attempted to use it in a smartphone, with its smaller processor and more constrained memory, the results were a failure and the product made no impression in the market.[22] Although Google identified certain aspects of certain Java SE API packages that it believed could be adapted for use in a smartphone context, it recognized that the large majority of Java SE was not useful in that context. Moreover, in order to make the potentially useful aspects of Java SE API packages viable in real-world smartphones, Google also had to develop an operating system and a substantial amount of additional functionality. Thus, even after Google included the SSO and declaring code for 37 of the Java SE API packages in Android, for Android to become a market success, Google also had to develop declaring and implementing code not only for those 37 API packages but also for approximately 131 other API packages, plus the other Android

[21] Astrachan Opening (January 8, 2016) Report ¶135.

[22] See n.6.

libraries, the Android applications framework, and numerous other functionalities as I described in the Leonard Report.[23]

20. In short, one could not simply substitute the Java SE applications framework for the Android operating system in a smartphone context. To provide a world-class smartphone product, Google needed to do both less—omitting API packages and functionality not suited for the smartphone context—and more—by adding additional, mobile-specific API libraries, mobile-specific implementing code for all API packages, and the other layers of the Android stack. This is demonstrated both by the efforts Google made in developing Android and by Sun/Oracle's failure to develop any commercially viable smartphone offering.

VII. Google's Use of the Copyrighted Material Asserted in this Case Was Transformative

21. As discussed above, Google created a new product (Android) that was substantially differentiated from, and not in the same market as, existing Sun/Oracle products (i.e., Java ME and Java SE). Moreover, for Android to be a market success, Google had to combine the copyrighted material asserted in this case with a substantial amount of other functionality, including the implementing code of the 37 Java SE API packages at issue, all the code—declaring and implementing—of an additional 131 API packages, the Linux kernel, myriad applications such as a camera and a phone, etc. The allegedly infringing material at issue here—the declaring code and SSO of the 37 API packages—made up only about 0.08% of the entire Android code base.[24] Google created and/or adapted all this additional functionality in order to provide a full-stack mobile device operating system with applications development framework that was substantially differentiated from any other available product. Dr. Schmidt claims that the use of the SSO and declaring code from the Java SE API packages in Android is not transformative because the SSO and declaring code perform the same functions in Android as they

[23] Leonard Report ¶¶ 67-74.

[24] Leonard Report ¶¶ 11, 202.

did in Java SE. I understand that other experts retained by Google will be responding to this assertion from a technical perspective. However, from an economic perspective, Dr. Schmidt is missing the point. Prior to the adoption by Google of the SSO and declaring code for these 37 Java SE API packages, those packages were unable to perform any commercially relevant function in any smartphone product. It was only through Google's transformation of those packages within Android that the packages gained the ability to function in the context of a modern smartphone operating system.

22. Sun's and Oracle's own conduct further demonstrates that the transformation of the copyrighted material asserted in this case that Google succeeded in achieving was necessary if that material was to be used in the new product area of smartphones. Sun, and then Oracle, recognized that Java ME was not suitable for smartphones and made various attempts to create a mobile operating system stack that could have been used in the smartphone market. However, they each failed in their various attempts to perform the transformation that Google achieved.[25] Only very recently (February 2016) has Oracle finally reached an initial milestone in the development of a version of the Java SE API packages (OpenJDK for Mobile[26]) that may, in time, be shown to be useful in a mobile context (although the market success of this effort remains to be seen). That it took Sun/Oracle many years to reach even this preliminary stage demonstrates that what Google did was not straightforward; it transformed a small portion of the Java SE applications platform into a much more significant, much more highly functional product serving a different, more advanced consumer market.

23. Dr. Jaffe claims that in the early 2000s, as the "mobile market took off, Sun was poised to take off with it."[27] This is incorrect. Prior to Android's launch, Sun had already tried and failed to develop a mobile stack. At that point, Sun's best hope of participating in the smartphone market was to

[25] Leonard Report ¶¶ 257-268.

[26] "Android Platform Implementation Details," http://openjdk.java.net/projects/mobile/android.html.

[27] Jaffe Report ¶ 19.

adapt its Java ME platform, but, as discussed above, this product had no reasonable likelihood of success in that area given that it was obsolete, lacked the functionality required to operate a commercially viable smartphone, and was fragmented. Android succeeded where Sun and Oracle failed. This demonstrates both that Sun and Oracle have sustained no harm due to the alleged infringement and that Google's use of the copyrighted material asserted in this case was transformative.

VIII. Google's Use of the Copyrighted Material Asserted in this Case Did Not Harm the Market for Java SE, the Copyrighted Work at Issue Here

24. I discussed in the Leonard Report why Sun/Oracle's lost profits on Java ME licensing due to the alleged infringement were zero.[28] Java ME was unsuited for use in smartphones by its design, because it lacked even the applications framework functionality required to run on a smartphone.

25. In any event, I understand that, for purpose of the fair use analysis, the relevant question is the extent to which the alleged infringement caused harm to the market for the copyrighted work at issue—in this case, Java SE (not Java ME). Google is not accused of infringing any copyrights related to Java ME in this case. But as discussed above, much like Java ME, Java SE was not suited for use, and had never been adapted for use, in any commercially successful smartphone product, even as an applications framework. Certainly, as discussed above, Sun/Oracle had never been able to develop a full-stack mobile operating system, using Java SE or any other technology. Accordingly, neither Java SE (the relevant copyrighted work here) nor Java ME is a substitute for Android. For these reasons, Java SE was not harmed by Android, a new and different product sold into a market that none of the Java platforms were capable of addressing.

26. Dr. Kemerer is mistaken when he claims that "the existence of OpenJDK has no bearing on the impact that Google's use of the 37 Java [SE] APIs had on the market for Java."[29] By making its

[28] Leonard Report ¶¶ 207-212.

[29] Kemerer 2/8/16 Report ¶ 230; see also Kemerer 1/8/16 Report ¶¶ 15, 225.

Java SE API packages available under an open-source license, Sun's OpenJDK project opened the door for any third party, or at least any third party with sufficient technical capability and resources, to use those Java SE API packages in a smartphone operating system. These risks would have been present even had Google chosen not to use the Java SE APIs itself in Android. Moreover, to the extent that Oracle claims to have concerns about "fragmentation" of the Java ecosystem as the result of Android's use of only 37 Java SE API packages (rather than using all the API packages, including those never suited for use in smartphones), Sun's OpenJDK release expressly permitted exactly this sort of use of the Java SE APIs.[30] Much as Google has done in adopting OpenJDK for future versions of Android, any OpenJDK licensee could have used only some of the Java SE API packages, linking them under the terms of the GPL with Classpath exception license to other API packages or modules from other sources. To the extent Oracle would claim that this subsetting or supersetting of the Java SE API packages is harmful to Java, it is important to note that Sun designed OpenJDK to permit this result, presumably because Sun believed, as its CEO Jonathan Schwartz testified at trial, that Sun's business strategy for Java was to make its APIs open, then "compete on implementations."[31]

IX. Other Points

27. Dr. Jaffe appears to equate the SSO and declaring code of the 37 APIs with the entirety of Android.[32] As discussed in the Leonard Report, this is incorrect because Android has a substantially greater number of functionalities.[33]

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[30] "OpenJDK FAQ" Java, December 18, 2010, http://openjdk.java.net/faq/; Astrachan Opening Report (Jan. 8, 2016) ¶¶ 104-06; Astrachan Rebuttal Report (Feb. 8, 2016) ¶¶ 38-40 and Oracle documents and testimony cited therein; GOOG-00000383 (video of Sun CEO Jonathan Schwartz); GOOG-00000496 (video of Sun vice president Rich Green).

[31] Tr. Transcript at 1962, 1965 and 2003 (Jonathan Schwartz).

[32] Jaffe Report ¶ 12 ("Java-based Android"; "Google's gain is Oracle's loss").

[33] Leonard Report ¶¶ 96-98, 200. Dr. Jaffe also appears to equate certain products that had a Java version on them, such as the "Java Ring," with products that have Android on them, such as smartwatches. Again, Dr. Jaffe fails to recognize the substantial differences in functionality between the two types of products. The Java

28. Dr. Jaffe, like Dr. Kemerer, confuses declaring code and implementing code.[34] Google wrote its own implementing code or adapted open source implementing code.[35] I understand that only the declaring code (along with the SSO) of the 37 API packages is at issue in this case.

29. Dr. Jaffe, like Dr. Kemerer, misconstrues the GPL with Classpath exception.[36] The GPL with Classpath exception has proven acceptable to both Google and Android handset OEMs, as demonstrated by the facts that code licensed under the GPL (with system exceptions) has been included in Android in the past and that Google has now switched over to the OpenJDK versions of the 37 API packages at issue. Dr. Jaffe's position is further undercut by Oracle's participation in the OpenJDK for Mobile project, an initiative through which Oracle is now offering "the ability to build both iOS and Android Java 9 binaries."[37] In other words, Oracle is now building and offering OpenJDK-based technology specifically for use in Android phones. This reinforces both the viability of an OpenJDK-based solution generally and the fact that none of Oracle's Java platforms constitute substitutes for Android; at most, they would be add-ons to the broad range of functionality enabled by a smartphone operating system.

Ring was meant to enable users to digitally open doors, log onto computers and store electronic information, however "[t]he ring, just like Java, wasn't quite the runaway success Sun had hoped. . ." Over the two years ending in 2001, just over 24,000 Java-powered rings and watches had been sold which stored personal user names, passwords and PC preferences. See "New Java Ring is Like Tiny PC on Your Hand," The Arizona Daily Star, August 17, 1998; "Home Sweet iPod," The Courier Mail, December 13, 2003; "Charmed Chips Smart Jewelry Inspired by the Promise of Completely Mobile Computing Will Be Making its Way Out of Research Labs," Los Angeles Times, January 4, 2001. Comparatively, Android smartwatches include calendar notifications, text and news updates, 3G and 4G network connectivity, games, and other applications. See "Wearable Tech," Samsung, http://www.samsung.com/us/mobile/wearable-tech. Thus, the Java Ring is not a close substitute for an Android smartwatch; in fact, it was a commercial failure. "Charmed Chips Smart Jewelry Inspired by the Promise of Completely Mobile Computing Will Be Making its Way Out of Research Labs," Los Angeles Times, January 4, 2001.

[34] Jaffe Report ¶ 11 ("Google instead chose to without authorization copy the Java API packages").

[35] Leonard Report ¶ 98.

[36] Leonard Report ¶ 149, fn. 270.

[37] February 16, 2016 email from Bob Vandette, an Oracle employee, to the OpenJDK Mobile Project email list. See also "Android Platform Implementation Details," http://openjdk.java.net/projects/mobile/android.html.

30. I also disagree with Dr. Jaffe's reliance on Dr. Kemerer's conclusions with regard to the supposed stability that the 37 Java SE packages provided to Android.[38] Dr. Kemerer first offered this stability analysis in his January 8, 2016 Opening Report and repeats that analysis in his February 8, 2016 Rebuttal Report. As previously explained in the Leonard Report, I disagree with Dr. Kemerer's analysis and conclusions for the reasons explained in the Leonard Report, including ¶ 98.

31. Dr. Jaffe, like Mr. Malackowski, claims that Google had a limited window of opportunity to launch Android.[39] However, he bases this claim entirely on anecdotal statements by Google employees, while conducting no analysis of the issue and failing to identify the beginning, ending, or duration of the claimed window. Dr. Jaffe also ignores numerous facts that contradict his claim, including that Google could have avoided infringement without incurring any delay;[40] that Blackberry was introduced before Android, used the Java ME applications platform, and yet was a failure;[41] and that Android was actually a relative late-comer to the smartphone market, with only one lower-end phone released by the end of 2008 and higher-end models coming out only in late 2009, yet has grown into the most successful smartphone platform in the world in terms of unit sales. Similarly, Dr. Jaffe argues that Google's use of the declaring code and SSO of the 37 API packages was "commercial" because they were "essential" for Android's success.[42] This statement begs the question and is also incorrect. As discussed above and in the Leonard Report, the allegedly infringed works were not "essential" to the success of Android because they were a small part of Android and Google could have avoided using them altogether, by taking a license under OpenJDK or adopting a different programming language, such as C/C++.

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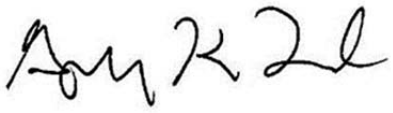
[38] Jaffe Report ¶ 217 (citing Kemerer Opening Report (Jan. 8, 2016) ¶¶ 33-35, 39).

[39] Jaffe Report ¶¶ 21, 147, 196, 200.

[40] Leonard Report ¶ 175-181, 270

[41] Leonard Report ¶ 121-122.

[42] Jaffe Report ¶ 212 (heading).



Gregory K. Leonard
February 29, 2016

Appendix A

GREGORY K. LEONARD

Gregory K. Leonard is a Partner at Edgeworth Economics specializing in applied microeconomics and econometrics.

Dr. Leonard has written widely in the areas of antitrust, industrial organization, econometrics, intellectual property, class certification, and labor economics. His publications have appeared in the *RAND Journal of Economics*, the *Journal of Industrial Economics*, the *Journal of Econometrics*, the *International Journal of Industrial Organization*, the *Journal of Public Economics*, *Annales Economie et de Statistique*, the *Journal of Labor Economics*, the *International Journal of the Economics of Business*, *Antitrust Law Journal*, *Antitrust*, *Antitrust Source*, the *Journal of Economic Analysis & Policy*, *Journal of Competition Law and Economics*, the *Journal of Economic Surveys*, *法学家 (Jurists' Review)*, *Antitrust Chronicle*, the *Berkeley Technology Law Journal*, the *Columbia Science and Technology Law Review*, the *European Competition Law Review*, *les Nouvelles*, *Landslide*, *Managing Intellectual Property*, *Legal Issues of Economic Integration*, *Kokusai Shoji Houmu (International Business Law and Practice)*, and the *George Mason Law Review*. Dr. Leonard authored two chapters and co-authored another chapter in the American Bar Association Section of Antitrust Law (ABA) volume *Econometrics* (2nd Ed., 2014), co-authored two chapters in the ABA volume *Issues in Competition Law and Policy*, and co-authored the "Econometrics and Regression Analysis" chapter of the ABA volume *Proving Antitrust Damages* (2nd Ed., 2010). He co-edited *Economic Approaches to Intellectual Property: Policy, Litigation, and Management* and authored or co-authored three of its chapters. One of these chapters (co-authored with Lauren J. Stiroh) was cited by the Court of Appeals for the Federal Circuit in its *Uniloc* decision. Dr. Leonard is a Senior Editor of the *Antitrust Law Journal* and has served as a referee for numerous economics journals.

Dr. Leonard was invited to speak on merger simulation at the 2004 US Department of Justice and Federal Trade Commission (FTC) Merger Workshop, the econometrics of evaluating competition in local retail markets at the 2008 FTC Retail Mergers Workshop, and the calculation of patent damages at the 2009 FTC Hearings on the Evolving IP Marketplace. The 2011 FTC report resulting from the latter hearings cited Dr. Leonard extensively. In 2005, Dr. Leonard served as a consultant on the issue of immunities and exemptions to the Antitrust Modernization Commission (AMC), which was tasked by Congress and the President with developing recommendations for changes to the US antitrust laws. He testified before the AMC in December 2005. Dr. Leonard gave an invited presentation on the use of natural experiments in antitrust at the European Commission's Directorate General for Competition (DG Comp) in 2014.

Dr. Leonard has extensive experience with international antitrust and intellectual property issues, particularly in Asia. He has been retained by the Anti-Monopoly Bureau of China's Ministry of Commerce (MOFCOM) as an outside economics expert to assist in merger reviews. Dr. Leonard has given invited presentations at MOFCOM, the Supreme People's Court of China, Renmin University, the Chinese Academy of Social Sciences, and the University of Political Science and Law. He was a member of ABA and US Chamber of Commerce delegations to joint workshops with the Chinese antitrust agencies, MOFCOM, NDRC, and SAIC, and served on the working groups of the ABA's Sections of Antitrust Law and International Law that prepared comments on MOFCOM's and SAIC's draft regulations. Dr. Leonard has also given presentations to the Japan Fair Trade Commission and the India Competition Commission.

Dr. Leonard has experience in a broad range of industries, including pharmaceuticals, telecommunications, airlines, semiconductors, hedge funds, securities, commercial and recreational fishing, medical devices, professional sports, credit card networks, payment systems, information services, computer software, computer hardware, chemicals, plastics, flat glass, retailing, advertising, beef processing, fertilizers, printing, petroleum, steel, beer, cereals, cosmetics, athletic apparel, film, milk, canned fish, vitamins, animal feed supplements, tissue, paperboard, industrial gas, concrete, automobiles, contact lens cleaners, sports beverages, soft drinks, diapers, tobacco products, graphite and carbon products, and modems, among others.

Dr. Leonard has provided written and oral testimony and presentations before federal and state courts, government agencies, and arbitration panels on issues involving antitrust, damages estimation, statistics and econometrics, surveys, valuation, and labor market discrimination.

Prior to joining Edgeworth, Dr. Leonard was a Senior Vice President at NERA and Lexecon Inc., a founding member and Director of Cambridge Economics, Inc., and an Assistant Professor at Columbia University, where he taught statistics, econometrics, and labor economics.

Dr. Leonard received an Sc.B. in Applied Mathematics-Economics from Brown University and a Ph.D. in Economics from the Massachusetts Institute of Technology, where he was a National Science Foundation Graduate Fellow and an Alfred P. Sloan Foundation Fellow.

EDUCATION

Massachusetts Institute of Technology

PhD, Economics, 1989
Alfred P. Sloan Foundation Fellowship, 1988-1989
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Brown University

ScB, Applied Mathematics-Economics, 1985
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PROFESSIONAL EXPERIENCE

2012-	Partner, Edgeworth Economics
2008-2012	Senior Vice President, NERA Economic Consulting
2004-2008	Vice President, NERA Economic Consulting
2000-2004	Senior Vice President, Lexecon, Inc.
1991-2000	Director, Cambridge Economics, Inc.

1990-1991 Senior Analyst, NERA Economic Consulting

1989-1990 Assistant Professor, Columbia University (Teaching Areas: Econometrics, Statistics, Labor Economics)

PAPERS AND PUBLICATIONS

"A Proposed Method for Measuring Competition Among Imperfect Substitutes," *Antitrust Law Journal* 60, 1992, pp. 889-900 (with J. Hausman and D. Zona).

"Issues in the Contingent Valuation of Environmental Goods: Methodologies for Data Collection and Analysis," in *Contingent Valuation: A Critical Assessment*, Ed. by J. A. Hausman, North Holland Press, 1993 (with D. McFadden).

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"Does Contingent Valuation Measure Preferences? Experimental Evidence," in *Contingent Valuation: A Critical Assessment*, ed. by J. A. Hausman, North Holland Press, 1993 (with P. Diamond, J. Hausman, and M. Denning).

"Competitive Analysis with Differentiated Products," *Annales d'Economie et de Statistique* 34, 1994, pp. 159-180 (with J. Hausman and D. Zona).

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Discussant, "New Developments in Antitrust" session, AEA meetings, January 7, 2000.

"In Defense of Merger Simulation," Department of Justice and Federal Trade Commission Merger Workshop, Unilateral Effects Session, February 18, 2004.

Discussant, "Proving Damages in Difficult Cases: Mock Trial & Discussion," NERA Antitrust & Trade Regulation Seminar, July 10, 2004.

"Network Effects, First Mover Advantage, and Merger Simulation in Damages Estimation," LSI Workshop on Calculating and Proving Patent Damages, July 16, 2004.

"Early Exchange of Documents," LSI Workshop on Pre- and Early Stage Patent Litigation, July 23, 2004.

"Lessons Learned From Problems With Expert Testimony: Antitrust Suits," LSI Workshop on Effective Financial Expert Testimony, November 4, 2004.

"Price Erosion and Convoyed Sales," LSI Workshop on Calculating & Proving Patent Damages, January 19, 2005.

"Economic Analysis of Rule 23(b)(3)," LSI Litigating Class Action Suits Conference, June 6, 2005.

"Early Exchange of Documents," LSI Workshop on Pre- & Early-Stage Patent Litigation, July 22, 2005.

"Issues to Consider in a Lost Profits Damages Analysis," Patent Litigation 2005, Practicing Law Institute, September 30, 2005.

"Antitrust Issues in Standard Setting and Patent Pools," Advanced Software Law and Practice Conference, November 3, 2005.

"New Technologies for Calculating Lost Profits," LSI Workshop on Calculating & Proving Patent Damages, February 27, 2006.

"Estimating Antitrust Damages," Fair Trade Commission of Japan, April 21, 2006.

"Economic Analysis of Rule 23(b)(3)," LSI Litigating Class Action Suits Conference, May 11, 2006.

"Permanent Injunction or Damages: What is the Right Remedy for Non-Producing Entities?," San Francisco Intellectual Property Law Association/Los Angeles Intellectual Property Law Association Spring Seminar, May 20, 2006.

"Antitrust Enforcement in the United States" and "Economic Analysis of Mergers," Sino-American Symposium on the Legislation and Practice of Anti-Trust Law, Beijing Bar Association, Beijing, People's Republic of China, July 17, 2006.

"Economic Analysis in Antitrust," Chinese Academy of Social Sciences, Beijing, People's Republic of China, July 20, 2006.

"Issues to Consider in a Lost Profits Damages Analysis," Patent Litigation 2006, Practicing Law Institute, September 26, 2006.

"Comparison of the Almost Ideal Demand System and Random Coefficient Models for Use With Retail Scanner Data," Pacific Rim Conference, Western Economic Association, Beijing, People's Republic of China, January 12, 2007 (with F. Deng).

Discussant, "Applied Economics" Session, Pacific Rim Conference, Western Economic Association, Beijing, People's Republic of China, January 12, 2007.

"Balancing IPR Protection and Economic Growth in China," International Conference on Globalization and the Protection of Intellectual Property Rights, Chinese University of Political Science and Law, Beijing, People's Republic of China, January 20, 2007.

"The Use and Abuse of Daubert Motions on Damages Experts: Lessons from Recent Cases," LSI Workshop on Calculating & Proving Patent Damages, February 27, 2007.

"Will Your Licenses Ever be the Same? Biotechnology IP Strategies," BayBio 2007 Conference, April 26, 2007.

"Tension Between Antitrust Law and IP Rights," Seminar on WTO Rules and China's Antimonopoly Legislation, Beijing, People's Republic of China, September 1, 2007.

"Issues to Consider in a Lost Profits Damages Analysis," Patent Litigation 2007, Practicing Law Institute, September 25, 2007.

Discussant, "Dominance and Abuse of Monopoly Power" Session, China's Competition Policy and Anti-Monopoly Law, J. Mirrlees Institute of Economic Policy Research, Beijing University, and the Research Center for Regulation and Competition, Chinese Academy of Social Sciences, Beijing, People's Republic of China, October 14, 2007.

"Opening Remarks," Seminar on China's Anti-monopoly Law and Regulation on Abuse of Intellectual Property Rights, Beijing, People's Republic of China, April 26, 2008.

"Issues to Consider in a Reasonable Royalty Damages Analysis," Patent Litigation 2008, Practicing Law Institute, October 7, 2008.

"Econometric Evaluation of Competition in Local Retail Markets," Federal Trade Commission and National Association of Attorneys General Retail Mergers Workshop, December 2, 2008

"Merger Review Best Practices: Competitive Effects Analysis," International Seminar on Anti-Monopoly Law: Procedure and Substantive Assessment in Merger Control, Beijing, People's Republic of China, December 15-17, 2008.

"The Use of Natural Experiments in Antitrust," Renmin University, Beijing, People's Republic of China, December 18, 2008.

"China's Antimonopoly Law: An Economist's Perspective," Bloomberg Anti-Monopoly Law of China Seminar, January 29, 2009.

Panelist, "Standards for Assessing Patent Damages and Their Implementation by Courts," FTC Hearings on the Evolving IP Marketplace, February 11, 2009.

"Economic Analysis of Agreements Between Competitors" and "Case Study: FTC Investigates Staples' Proposed Acquisition of Office Depot," Presentation to Delegation of Antitrust Officials from the People's Republic of China, Washington, DC, March 23, 2009.

"Reasonable Royalties in the Presence of Standards and Patent Pools," LSI Workshop, April 20, 2009.

Presentations on Unilateral Effects, Buyer Power, and the Intellectual Property-Antitrust Interface to Delegation from the Anti-Monopoly Bureau of MOFCOM of the People's Republic of China, Washington, DC, May 10-11, 2009.

Panelist, "The Use of Economic and Statistical Models in Civil and Criminal Litigation," Federal Bar Association, San Francisco, May 13, 2009.

"Trends in IP Rights Litigation and Economic Damages in China," Pursuing IP in the Pacific Rim, May 14, 2009.

Presentation on the Economics of Antitrust, National Judicial College of the People's Republic of China, Xi'an, People's Republic of China, May 25-26, 2009.

"Case Study: The Use of Economic Analysis in Merger Review," Presentation to the Anti-Monopoly Bureau of MOFCOM, Beijing, People's Republic of China, May 27, 2009.

"Economics and Antitrust Law," China University of Political Science and Law, Beijing, People's Republic of China, September 21, 2009.

"Case Study: Economic Analysis of Coordinated Interaction," Presentation to the Anti-Monopoly Bureau of MOFCOM, Beijing, People's Republic of China, September 22, 2009.

"Relevant Market Definition," 4th Duxes Antitrust Law Seminar, Beijing, People's Republic of China, September 26, 2009.

"Expert Economic Testimony in Antitrust Litigation," Supreme People's Court, Beijing, People's Republic of China, February 2, 2010.

"New Case Law for Patent Damages," Law Seminars International Telebriefing, April 28, 2010.

"China/India: Sailing in Unchartered Waters: Regulating Competition in the Emerging Economies – New Laws, New Enforcement Regimes and No Precedents," The Chicago Forum on International Antitrust Issues, Northwestern University School of Law Searle Center, May 20, 2010.

"Antitrust and Intellectual Property," Supreme People's Court, Beijing, People's Republic of China, May 26, 2010.

"Cartel Enforcement Trends in the United States," 2nd Ethical Beacon Anti-Monopoly Summit, Beijing, People's Republic of China, May 27, 2010.

Panelist, "The Future of Books and Digital Publishing: the Google Book Settlement and Beyond," 2010 American Bar Association Annual Meeting, August 7, 2010.

"Coordinated Effects" and "Non-Horizontal Mergers," Presentations to Delegation from India Competition Commission, US Chamber of Commerce, Washington, DC, October 26, 2010.

"UPP and Merger Simulation," Annual Conference of the Association of Competition Economics, Norwich, UK, November 11, 2010.

"Uniloc v. Microsoft: A Key Ruling For Patent Damages," Law Seminars International Telebriefing, January 21, 2011.

"Correlation, Regression, and Common Proof of Impact," New York City Bar Association, January 19, 2011.

"Private Litigation Under China's New Antimonopoly Law," Bar Association of San Francisco, February 17, 2011.

"Competition Law and State Regulation: Setting the Stage and Focus on State-Owned Enterprises," Competition Law and the State: International and Comparative Perspectives, Hong Kong, People's Republic of China, March 18, 2011.

Panelist, "Booking it in Cyberspace: The Google Book Settlement and the Aftermath," American Intellectual Property Law Association, San Francisco, May 13, 2011.

"Econometric Estimation of Cartel Overcharges," ZEW Conference on Economic Methods and Tools in Competition Law Enforcement, Mannheim, Germany, June 25, 2011.

Panelist, "Antitrust and IP in China," Antitrust and IP in Silicon Valley and Beyond, American Bar Association and Stanford University, Palo Alto, October 6, 2011.

Panelist, University of San Diego School of Law Patent Law Conference: The Future of Patent Law Remedies, January 18, 2013.

"Economics Framework," US-China Workshop on Competition Law and Policy for Internet Activities, China's State Administration for Industry and Commerce (SAIC) and the U.S. Trade and Development Agency (USTDA), Shenzhen, People's Republic of China, June 4-5, 2013.

Panelist, "China Inside and Out," American Bar Association, Beijing, People's Republic of China, September 16-17, 2013.

Panelist, "Remedies in Patent Cases," Fifth Annual Conference on The Role of the Courts in Patent Law & Policy, Berkeley and Georgetown Law Schools, November 1, 2013.

"Royalty Base," LeadershIP Conference, Qualcomm Incorporated, March 21, 2014.

"Reflections on Natural Experiments," DG Comp, April 8, 2014.

Panelist, "Antitrust in Asia: China," American Bar Association Section of Antitrust Law, Beijing, People's Republic of China, May 21-23, 2014.

Panelist, "Patent Damages Roundtable," 2015 Intellectual Property Institute, University of Southern California Gould School of Law, Los Angeles, March 23, 2015.

Panelist, "IP and Antitrust - The Current State of Economic Analysis," Global Competition Review Live 2nd Annual IP & Antitrust USA, Washington, DC, April 14, 2015.

Panelist, "FRAND Royalty Rates After Ericsson v. D-Link," American Bar Association, May 15, 2015.

PROFESSIONAL ACTIVITIES

Member, American Economic Association

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Associate Editor, *Antitrust*, 2007-2010

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Co-Editor, ABA Section of Antitrust Law Economics Committee Newsletter, 2009-2012

Member, Economics Task Force, ABA Section of Antitrust Law, 2011-2012

Member, ABA Delegation to International Seminar on Anti-Monopoly Law: Procedure and Substantive Assessment in Merger Control, Beijing, People's Republic of China, December 15-17, 2008

Member, Working Group for drafting the "Joint Comments of the American Bar Association Section of Antitrust Law and Section of International Law on the MOFCOM Draft Guidelines for Definition of Relevant Markets," 2009

Member, Working Group for drafting the "Joint Comments of the American Bar Association Section of Antitrust Law and Section of International Law on the SAIC Draft Regulations on the Prohibition of Acts of Monopoly Agreements and of Abuse of Dominant Market Position," 2009.

Member, Working Group for drafting the "Joint Comments of the American Bar Association Section of Antitrust Law and Section of International Law on the SAIC Draft Regulations on the Prohibition of Acts of Monopoly Agreements and of Abuse of Dominant Market Position," 2010.

Referee: *Econometrica*, *Review of Economics and Statistics*, *International Journal of Industrial Organization*, *Review of Industrial Organization, Journal of Sports Economics*, *Journal of Environmental Economics and Management*, *Research in Law and Economics*, *Labour Economics*, *Eastern Economic Journal*, *Journal of Forensic Economics, Antitrust, Antitrust Law Journal, Journal of Competition Law and Economics, Advances in Econometrics.*

TESTIMONY IN THE LAST FIVE YEARS

Edwards Lifesciences AG and Edwards Lifesciences, LLC v. CoreValve, Inc., United States District Court for the District of Delaware, C.A. No. 08-091 (GMS), 2009-2011 (Report, Deposition, Updated Report, Trial Testimony, Declarations).

WiAV Solutions, LLC v. Motorola, Inc., et al., United States District Court, Eastern District of Virginia, Richmond Division, Civil Action No. 3:09-cv-447-REP, 2010 (Report, Deposition).

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Technology Patents, LLC v. Deutsche Telekom AG, et al., United States District Court, District of Maryland, Civil Action No. 8:07-cv-03012-AW, 2010 (Report).

Hollister Incorporated. v. C.R. Bard, Inc., United States District Court, Northern District of Illinois, Eastern Division, Civil Case No. 10-6427, 2011 (Deposition).

Quercus Trust v. LiveFuels, Inc., et al., Superior Court for the State of California, Civil No. 488685, 2011 (Deposition).

In re: Budeprion XL Marketing and Sales Practices Litigation, Civil Action 2:09-CV-2811, MDL Docket No. 2017, 2011 (Deposition).

Convolve, Inc. v. Dell Inc., et al., United States District Court, Eastern District of Texas, Marshall Division, Case No. No. 2:08-cv-244, 2011 (Deposition, Trial Testimony).

In the Matter of CERTAIN WIRELESS COMMUNICATION DEVICES, PORTABLE MUSIC AND DATA PROCESSING DEVICES, COMPUTERS AND COMPONENTS THEREOF, before the United States International Trade Commission, Investigation No. 337-TA-745, 2011 (Deposition).

In the Matter of CERTAIN MOBILE DEVICES, ASSOCIATED SOFTWARE, AND COMPONENTS THEREOF, before the United States International Trade Commission, Investigation No. 337-TA-744, 2011 (Deposition).

Oracle America, Inc. v. Google, Inc., United States District Court, Northern District for California, Case No. 3:10-CV-03561-WHA, 2011 (Deposition).

In the Matter of CERTAIN GAMING AND ENTERTAINMENT CONSOLES, RELATED SOFTWARE, AND COMPONENTS THEREOF, before the United States International Trade Commission, Investigation No. 337-TA-752, 2011 (Deposition).

General Atomics v. Paul Banks and TetraVue, Inc., Superior Court of the State of California, Case No. 37-2009-00084081-CU-BC-CTL, 2011 (Deposition, Trial Testimony).

Apple Inc., v. Motorola, Inc., United States District Court, Western District of Wisconsin, Case No. 10-CV-662 (BBC), 2011 (Deposition).

Genentech, Inc. and City of Hope v. Glaxo Group, Limited, et al., United States District Court, Central District of California, Western Division, Case No. 2:10-CV-02764-MRP (FMOx), 2011 (Deposition).

In the Matter of CERTAIN HANDHELD COMPUTING DEVICES, RELATED SOFTWARE, AND COMPONENTS THEREOF, before the United States International Trade Commission, Investigation No. 337-TA-769, 2011 (Deposition, Trial Testimony).

In the Matter of CERTAIN EQUIPMENT FOR COMMUNICATIONS NETWORKS, INCLUDING SWITCHES, ROUTERS, WIRELESS ACCESS POINTS, CABLE MODEMS, IP PHONES, AND PRODUCTS CONTAINING SAME, before the United States International Trade Commission, Investigation No. 337-TA-778, 2012 (Deposition).

Plantronics, Inc. v. Aliph, Inc., United States District Court for the Northern District of California, San Francisco Division, Case No. C09-01714 BZ, 2012 (Deposition).

Commonwealth Scientific and Industrial Research Organization v. Lenovo, Inc., et al., United States District Court for the Eastern District of Texas, Tyler Division, Case No. 6:09-cv-00400-LED, 2012 (Deposition).

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In the Matter of CERTAIN DEVICES FOR IMPROVING UNIFORMITY USED IN A BACKLIGHT MODULE AND COMPONENTS THEREOF AND PRODUCTS CONTAINING THE SAME, before the United States International Trade Commission, Investigation No. 337-TA-805, 2012 (Deposition, Trial Testimony).

Rachel Eastman, et al. v. First Data Corporation, et al., United States District Court, District of New Jersey, Case No. 2:10-cv-04860 (WHW) (MCA), 2012 (Deposition).

In the Matter of CERTAIN COMMUNICATIONS EQUIPMENT COMPONENTS THEREOF, AND PRODUCTS CONTAINING THE SAME, INCLUDING POWER OVER ETHERNET TELEPHONES, SWITCHES, WIRELESS ACCESS POINTS, ROUTERS AND OTHER DEVICES USED IN LANs, AND CAMERAS, before the United States International Trade Commission, Investigation No. 337-TA-817, 2012 (Deposition).

Fujitsu Limited v. Belkin, et al., United States District Court, Northern District of California, San Jose Division, Case No. 10-cv-03972-LHK(PSG), 2012 (Deposition, Trial Testimony).

Medivation, Inc. v. The Regents of the University of California, et al., Superior Court of the State of California, Case No. CGC-11-510715, 2012 (Deposition, Trial Testimony).

In Re Photochromic Lens Antitrust Litigation (Direct Purchaser Action), United States District Court for the Middle District of Florida, Tampa Division, MDL Docket No. 2173, 2012 (Deposition, Hearing Testimony).

In Re Photochromic Lens Antitrust Litigation (Indirect Purchaser Actions), United States District Court for the Middle District of Florida, Tampa Division, MDL Docket No. 2173, 2012 (Deposition, Hearing Testimony).

In the Matter of CERTAIN PRODUCTS CONTAINING INTERACTIVE PROGRAM GUIDE AND PARENTAL CONTROL TECHNOLOGY, before the United States International Trade Commission, Investigation No. 337-TA-845, 2012 (Deposition, Trial Testimony).

In the Matter of CERTAIN COMPUTERS AND COMPUTER PERIPHERAL DEVICES AND COMPONENTS THEREOF AND PRODUCTS CONTAINING THE SAME, before the United States International Trade Commission, Investigation No. 337-TA-841, 2012-2013 (Trial Testimony).

Gemalto SA v. HTC Corporation, et al., United States District Court for the Eastern District of Texas, Tyler Division, Civil Action No. 6:10-CV-561-LED, 2013 (Deposition).

Adobe Systems Incorporated v. Wowza Media Systems, LLC, et al., United States District Court for the Northern District of California, Oakland Division, Case No. cv 11-02243, 2013 (Deposition).

In the Matter of CERTAIN AUDIOVISUAL COMPONENTS AND PRODUCTS CONTAINING THE SAME, before the United States International Trade Commission, Investigation No. 337-TA-837, 2013 (Deposition).

Ericsson Inc., et al. v. D-Link Corporation, et al., United States District Court for the Eastern District of Texas, Tyler Division, Civil Action No. 6:10-cv-473, 2013 (Deposition, Trial Testimony).

Edwards Lifesciences v. Medtronic CoreValve, et al., United States District Court for the District of Delaware, Case No. 12-23 (GMS), 2013 (Deposition, Trial Testimony).

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The Money Suite Company v. Insurance Answer Center, LLC, et al., United States District Court for the Central District of California, Southern Division – Santa Ana, Lead Case No. 11-SACV-01847 AG (JPRx), 2013 (Deposition).

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In the Matter of CERTAIN INTEGRATED CIRCUIT CHIPS AND PRODUCTS CONTAINING SAME, before the United States International Trade Commission, Investigation No. 337-TA-859, 2013 (Deposition, Trial Testimony).

Realtek Semiconductor Corporation v. LSI Corporation and Agere Systems, Inc., United States District Court Northern District of California, San Jose Division, Case No. 5:12-cv-03451 RMW, 2013 (Deposition, Trial Testimony).

Acer Inc., Acer America Corporation, and Gateway Inc. v. Technology Properties Limited, Patriot Scientific Corporation, and Alliacense Limited, United States District Court for the Northern District of California, San Jose Division, Case No. 5:08-cv-00877 PSG, 2013 (Deposition).

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In Re Innovatio IP Ventures, LLC Patent Litigation, United States District Court for the Northern District of Illinois, Case No. 1:11-cv-09308, 2013 (Deposition, Trial Testimony).

In the Matter of CERTAIN OMEGA-3 EXTRACTS FROM MARINE OR ACQUATIC BIOMASS AND PRODUCTS CONTAINING THE SAME, before the United States International Trade Commission, Investigation No. 337-TA-877, 2013 (Deposition).

Open Text SA v. Box Inc., United States District Court for the Eastern District of Virginia, Norfolk Division, Civil Action No. 2:13-CV-00319-MSD-DEM, 2013-2015 (Deposition, Trial Testimony).

Apple Inc. and Apple Sales International v. Motorola Mobility LLC, United States District Court for the Southern District of California, Case No. 3:12-cv-00355-GPC-BLM, 2013 (Deposition).

iControl Networks, Inc. v. Alarm.com Incorporated and Frontpoint Security Solutions, LLC, United States District Court for the Eastern District of Virginia, Alexandria Division, Case No. 1:13cv834 (LMB-IDD), 2013 (Deposition).

Affinity Labs of Texas, LLC v. General Motors LLC, United States District Court for the District of Eastern District of Texas, Beaumont Division, C.A. No. 1:12-cv-00582-RC, 2014 (Deposition).

W.L. Gore & Associates, Inc. v. C.R. Bard, Inc. and Bard Peripheral Vascular, Inc., United States District Court for the District of Delaware, C.A. No. 11-515-LPS-CJB, 2014 (Deposition).

Richard Noll and Rhythm Motor Sports, LLC v. eBay Inc., eBay Europe S.A.R.L., and eBay International AG, Inc., United States District Court for the Northern District of California, San Jose Division, Case No. 5:11-CV-04585-EJD, 2014 (Deposition).

Bristol-Myers Squibb Company v. Genentech Inc. and City of Hope, United States District Court for the Northern District of California, Western Division, Case No. 2:13-CV-05400-MRP (JEMx), 2014 (Report, Deposition).

Eli Lilly and Imclone v. Genentech Inc. and City of Hope, United States District Court for the Northern District of California, Western Division, Case No. 2:13-CV-07248-MRP, 2014 (Deposition).

Graftech International Ltd. and Graftech International Holdings Inc. F/K/A UCAR Carbon Company Inc. v. Carbone Savoie, Alcan France and Rio Tinto Alcan, International Chamber of Commerce, International Court of Arbitration, Case Ref.: 19798/AGF, 2014 (Report, Hearing Testimony).

Merit Medical Systems, Inc. v. Bard Access Systems, Inc., in the Third Judicial District Court for Salt Lake County, State of Utah, Civil No.: 130902435, 2014 (Report).

Samsung Electronics Co., Ltd. (Korea) v. Nokia Corporation (Finland), International Chamber of Commerce, International Court of Arbitration, Case Ref.: 19602/AGF/RD (c.19638/AGF), 2015 (Reports, Hearing Testimony).

Commonwealth Scientific and Industrial Research Organisation v. Mediatek Inc., et al., United States District Court for the Eastern District of Texas, Tyler Division, Case No. 6:12-cv-578 (LED), 2015 (Report, Rebuttal Report).

In the Matter of an Arbitration Under the Arbitration Act 1996 Between Teva Pharmaceutical Industries, Ltd. Teva Pharmaceuticals USA, Inc. and Starr Syndicate Limited, 2015 (Report).

In the Matter of CERTAIN NETWORK DEVICES, RELATED SOFTWARE, AND COMPONENTS THEREOF (I), before the United States International Trade Commission, Investigation No. 337-TA-944, 2015 (Report, Deposition).

Broadband iTV, Inc. v. Hawaiian Telecom, Inc., Oceanic Time Warner Cable, LLC, and Time Warner Cable, Inc., United States District Court for the District of Hawaii, Case No. 14-00169 ACK-RLP, 2015 (Declaration, Report, Deposition).

In the Matter of CERTAIN NETWORK DEVICES, RELATED SOFTWARE, AND COMPONENTS THEREOF (II), before the United States International Trade Commission, Investigation No. 337-TA-945, 2015 (Report, Deposition, Hearing Testimony).

SRI International, Inc. v. Cisco Systems, Inc., United States District Court for the District of Delaware, Case No. 13-1534 (SLR), 2015 (Report).

SELECTED MERGER EXPERIENCE

R.R. Donnelley/Meredith Burda (1990-1993): Merger of printing companies. Reviewed by the FTC. Preliminary Injunction Hearing. Part III Hearing.

Kimberly-Clark/Scott (1995): Merger of manufacturers of tissue products. Reviewed by the DOJ and the European Commission.

Staples/Office Depot (1996-1997): Proposed merger of office supply retailers. Reviewed by the FTC. Preliminary injunction hearing.

IMC/Western Ag (1997): Merger of mining companies. Reviewed by the DOJ.

Dow/Union Carbide (1999-2001): Merger of chemical manufacturers. Reviewed by the FTC.

Volvo/Scania (2000): Merger of truck manufacturers. Reviewed by the European Commission.

First Data/Concord (2003-2004): Merger of companies involved in merchant acquiring and payment networks. Reviewed by the DOJ.

Bumble Bee/Connors (2004): Merger of canned seafood manufacturers. Reviewed by the DOJ.

Sonaecom/Portugal Telecom (2006): Merger of telecommunications companies. Reviewed by the Portuguese Competition Authority.

Graphic Packaging/Altivity (2007-2008): Merger of paperboard manufacturers. Reviewed by the DOJ.

Inbev/Anheuser-Busch (2008): Merger of beer manufacturers. Reviewed by the DOJ, the UK Competition Commission, and MOFCOM.

Serta/Simmons (2009): Merger of mattress manufacturers. Reviewed by the FTC.

Coty/OPI (2010): Merger of nail polish manufacturers. Reviewed by the DOJ.

Knowles/NXP (2011): Knowles acquired the speaker/receiver business of NXP. Reviewed by MOFCOM.

AT&T/T-Mobile (2011): Consulted for the DOJ regarding the proposed deal between the two wireless service providers.

Confidential engagement for consumer product manufacturer (2012): Consulted for a consumer product manufacturer considering an acquisition with potential overlap in various jurisdictions around the world.

Confidential engagement for consumer product manufacturer (2012): Consulted for a consumer product manufacturer considering an acquisition with potential overlap in numerous product lines in the US.

UPS/TNT (2013): Consulted for the Ministry of Commerce of the People's Republic of China regarding the proposed deal between two package delivery services.

Thermo Fisher/Life Technologies (2014): Consulted for the Ministry of Commerce of the People's Republic of China regarding the proposed deal.

Appendix B

Appendix B
Additional Documents Considered

Bates Documents

GOOG-00000383
GOOG-00000496
OAGOOGLE00024737983
OAGOOGLE0002631102
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Other Documents

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Jonathan Baker, Market Definition, Antitrust Law Journal Jonathan B. Baker, "Market Definition: An Analytical Overview," Antitrust Law Journal (2007)
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